

REMARKS

Examiner is thanked for the Official Action of June 26, 2003. This request for reconsideration is intended to be fully responsive thereto.

DRAWING OBJECTION

The drawings were objected under 37 CFR 1.83(a) because the drawings did not show every feature of the invention specified in the claims. Examiner asserted that the "pair of backup rolls generating a pressing force on each work roll" (claim 1) is not shown.

In response to Examiner's objection, Applicant cancelled Claims 1-2 and amended Claim 3 to recite "a pair of backup rolls, wherein each of the backup rolls generates a pressing force onto each work roll". As Examiner suggested, this feature is clearly shown in and supported by Figure 4. Therefore, by this amendment, Applicant believes that no proposed drawing correction or corrected drawings are required and the objection to the drawing should be withdrawn.

REJECTION UNDER 35 U.S.C. 112

Claims 1-4 were rejected under 35 U.S.C. 112 because the "pair of backup rolls generating a pressing force onto each work roll" was not supported by the specification.

Claims 1-2 are cancelled by this amendment. Claim 3 is amended as above. Claim 4 is amended to be dependent from Claim 3. Therefore, by this amendment, the rejection under 35 U.S.C. 112 for Claims 1-4 should be withdrawn.

REJECTION UNDER 35 U.S.C. 112

Claims 1-8 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claims 1-8, Examiner suggested that the recitation "rolling/pressing" was unclear. Again, Claims 1-2 are cancelled. Claims 3-4 are amended to recite

"rolling and pressing" and also Claim 5-8 are amended to recite "[t]he rolling apparatus" instead of "rolling/pressing".

Regarding Claims 2-4, Examiner suggested that it was not clear as to whether "an electrode structure" was the same electrode structure as claimed in the parent Claim 1. Claim 2 is cancelled and Claims 3-4 are amended so that the unclear portion of "for rolling/pressing an electrode structure" is deleted. Amendment to Claim 3 is supported by Figure 4 and lines 5-6 of page 8 of the present specification. Amendment to Claim 4 is supported as described above.

Regarding Claim 5, Examiner suggested that it was not clear whether "an electrode structure" of line 5 was the same as the one in line 2. "[A]n electrode structure" of line 5 is the same as the one in line 5. Claim 5 is amended and is now dependent on Claim 3 and the unclear portion, "[A]n electrode structure", is deleted to comply with the Examiner's suggestion. Amendment to Claim 5 is supported by an implication of lines 24-25 of page 10 of the present specification.

Regarding Claim 5, Examiner suggested that it was not clear what "the other work roll" referring to. Further, Claims 6-8 were rejected for the same reason. Claim 5 is amended to delete "the other work roll." Therefore, Applicant believes that the amendment to Claim 5 and the amendments to Claims 6-8 together are sufficient to eliminate the 35 U.S.C. 112 rejections.

NEW CLAIMS 13-16

All newly asserted claims 13-16 are supported by the original specification and drawings. Claim 13, disclosing "a pair of work rolls" and "one backup roll," is supported by Figure 5 and lines 20-23 of page 10 of the present specification. Claim 14 is a dependent claim of Claim 13 adding the feature of Claim 4. Claim 15 is a dependent claim of Claim 13 adding the feature of Claim 5. Claim 16 is a dependent claim of Claim 13 adding the feature as shown in Figure 5.

REJECTIONS UNDER 35 U.S.C. 103 REGARDING CLAIMS 1-2 AND 5-6

Claims 1-2 and 5-6 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese Provisional Patent Publication No. 10-270296 to Shimizu et al. in view of U.S. Patent No. 4,700,557 to De Mol et al.

Examiner suggested that Shimizu '296 discloses a rolling apparatus for rolling an electrode structure comprising a pair of work rolls and a pressing force onto the surface of the roll. The Examiner continued that Shimizu '296 does not expressly disclose the pressing force is a pair of pressurized backup rolls but a similar rolling art in De Mol '557 makes it obvious to one having ordinary skilled in the art at the time the invention was made to have provided Shimizu '296 with the type of rolling apparatus as taught by De Mol '557 in order to improve controlling the shape of the pressing material.

Applicant respectfully disagrees with the Examiner's reasoning. However, by this amendment, Applicant cancelled the subject claims 1-2 and amended claims 5-6 for the purpose of expediting the process of this examination. Therefore, the Examiner's rejection as to Claims 1-2 and 5-6 are now moot.

REJECTIONS UNDER 35 U.S.C. 103 REGARDING CLAIMS 3 and 7

Examiner suggested that Shimizu '296 does not expressly disclose the type of layer on the surface of the backup roll. However, the Japanese Provisional Patent Publication No. 7-287465 to Yoshida teaches a backup roll that has an elastic layer on the outer periphery.

Different Structure for Different Purpose

To begin with, in Yoshida '465, a backup roll 14 means a roll to be pressed against a heat roll 12. See Claim 1 and numerous portions of the specification, e.g., abstract, paragraphs [0005] and [0007]. In other words, the heat roll 12 and the "backup roll" 14 in Yoshida '465 are equivalent to "work rolls" in the present invention.

Furthermore, Yoshida '465 employed the elastic layer in a completely different structure for completely different purposes. A major purpose of Yoshida '465 is to avoid wearing of the work roll (backup roll 14) and the paper guides 18(a), 18(b). See abstract and paragraphs [0012], [0016] of Yoshida '465.

In Yoshida '465, the work roll (backup roll 14) has the elastic layer coated thereon, two projections 22a, 22b integrally formed on the elastic layer, and two peripheral grooves 20a, 20b formed on the projection 22a, 22b (see Figure 2). Each end of the paper guides 18(a), 18(b) is inserted in one of two peripheral grooves 20a, 20b without making contact therebetween. As rotating the heat roll 12 and the work roll (backup roll 14), the heat roll 12 presses the elastic layer of the work roll and deforms the projections 22a, 22b to fill the peripheral grooves 20a, 20b of the work roll surface. See paragraphs [0009] through [0013] of Yoshida '465.

The present invention proposes the particular rolling apparatus for electrode structures. Generally, the work roll may be a steel roll. In order to compress such electrode structure body to provide sufficient density and uniform surface, high pressure needs to be applied thereon. Therefore, the work rolls, which pressurize the electrode structure body, needed to be made of hard material such as steel. In addition, because of the high pressure, the work rolls need the extra help of the backup rolls where the work rolls 43, 43 are pressurized by backup rolls 42, 42. Then, it is naturally concluded that both work rolls 43, 43 and the backup rolls 42, 42 are made of hard material.

However, as the hard contacting surfaces between the work rolls and the backup rolls press against each other, a frictional engagement between the contacting surfaces generates metal powder due to wearing. Also, such frictional engagement damages the contacting surfaces. Generally, to avoid the metal powder and damage problems, oil or grease has been used on the contacting surfaces. However, oil or grease cannot be used when manufacturing the electrode structure for a secondary battery or a capacitor because the slight oil/grease will ruin the resulting products.

To resolve this problem, the backup roll (not work roll) 42 of the present invention has an elastic material on its surface. This present invention structure gives

sufficient pressure to create the high density electrode and uniform surface thereof at the same time. In addition to these advantages, using the elastic material on the surface contacting with the work roll surface will eliminate the chance of generating metal powder and thus eliminate the chance of causing the resultant damage.

Conclusion

Yoshida '465 is designed to roll paper and to prevent the work roll and the paper guide from being damaged. In order to attain the objects, Yoshida '465 employed the above-described structure, which is totally different from the present invention.

Accordingly, the concept of Yoshida '465, i.e., using the elastic layer on the work roll, cannot simply be employed and modified to reach the present invention. It is not possible for the type of product, i.e., an electrode structure, to be pressed through the rolls of Yoshida '465 to complete a final product because the work roll with the elastic surface cannot give high density and uniform pressing. Such high density and uniform pressing is critical for the production of an effective electrode structure.

Moreover, using the elastic surface on the work roll can not produce the high density electrode and uniform surface thereof as it would be generated when Yoshida '465 is combined with Shimizu '296 and/or De Mol '557. Therefore, the differences between the present invention and Yoshida '645 should be sufficient to remove the rejection for Shimizu '296 and De Mol '557 further in view of Yoshida '465.

REJECTIONS UNDER 35 U.S.C. 103 REGARDING CLAIMS 4 and 8

Examiner suggested that Shimizu '296 does not expressly disclose the specific details (i.e., roll housing, roll axle...) of the apparatus; however, U.S. Patent No. 5,042,281 to Metcalfe teaches a rolling apparatus comprising: a work roll (22) having an axle mounted in a housing (124) and an opposite work roll (24) having an axle mounted in an opposite housing (126). Regarding the spacer between the housings, Examiner suggested that the use of a spacer is well known in the mechanical art.

By these amendments, Claims 4 and 8 were made dependent from Claim 3.

Therefore, for the same reason stated in the reason for rejection above, the combination of Shimizu '296 and Metcalfe '281 do not make Claims 4 and 8 of the present invention unpatentable.

Furthermore, in response to the spacer and the use of the spacer, Examiner merely asserts that "the use of spacer is well known in the mechanical art and is readily available hardware known to the skilled artisan for their intended purposes". The Examiner is reminded that the mere fact that a prior art reference can be modified does not render the resultant combination obvious. The prior art must also suggest the desirability of the combination. MPEP 2143.01. The prior art simply fails to provide proper motivation to modify Shimizu '296 to render the presently claimed invention obvious. Thus, Applicant submits that Examiner is impermissibly reconstructing the Applicant's Invention.

CONCLUSION

By these amendments, the rejections under 35 U.S.C. 112 and the drawing objection should be overcome. Because of the structural difference and the different objectives between the present invention and Shimizu '296 and De Mal '557 in view of Yoshida '465, as explained above, and because of the structural difference between the present invention and Shimizu '296 and De Mal '557 in view of Metcalfe '281, Claims 3-8 and 13-16 should be sufficient to overcome the examiner's rejection under 35 U.S.C. 103.

It is respectfully submitted that claims 3-8 and 13-16 are now in condition for allowance and notice to that effect is requested. No new matter has been added.

Should the examiner believe further discussion regarding the above claim language would expedite prosecution they are invited to contact the undersigned at the number listed below.

Respectfully submitted,

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